NOTICES OF PUBLIC INFORMATION

Notices of Public Information contain corrections that agencies wish to make to their notices of rulemaking; miscellaneous rulemaking information that does not fit into any other category of notice; and other types of information required by statute to be published in the *Register*. Because of the variety of material that is contained in a Notice of Public Information, the Office of the Secretary of State has not established a specific format for these notices.

NOTICE OF PUBLIC INFORMATION

DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER QUALITY CONTROL

[M12-331]

1. A.R.S. Title and its heading: 49, The Environment
A.R.S. Chapter and its heading: 2, Water Quality Control
A.R.S. Article and its heading: 2.1, Total Maximum Daily Loads
Section: A.R.S. § 49-234, Total maximum daily loads; implementation plans

2. The public information relating to the listed statute:

Pursuant to A.R.S. § 49-234, the Arizona Department of Environmental Quality (Department or ADEQ) is required to develop a total maximum daily load (TMDL) for navigable waters that are listed as impaired. The purpose of this notice is to publish the Department's determinations of total pollutant loadings for TMDLs for the Gila River (Reaches 15040005-022, 15040002-004) that the Department intends to submit to the Regional Administrator for Region 9, U.S. Environmental Protection Agency (EPA) for approval.

Public notice of the opportunity for public comment on the draft "Gila River Total Maximum Daily Loads for Suspended Sediment Concentration" was published in *The Eastern Arizona Courier* and *The Copper Era*, newspapers of general circulation in the affected area, on January 12, 2011. The public comment period ended on February 11, 2011.

3. Total Maximum Daily Loads (TMDLs)

A. TMDL Process

A TMDL represents the total load of a pollutant that can be assimilated by a waterbody on a daily basis and still meet the applicable water quality standard. The TMDL can be expressed as the total mass or quantity of a pollutant that can enter the waterbody within a unit of time. In most cases, the TMDL determines the allowable concentration or density of a pollutant in units per day and divides it among the various contributors in the watershed as wasteload (i.e., point source discharge) and load (i.e., nonpoint source) allocations. The TMDL must also account for natural background sources and provide a margin of safety.

In Arizona, as in other states, changes in standards or the establishment of site-specific standards are the result of ongoing science-based investigations or changes in toxicity criteria from EPA. Changes in designated uses and standards are part of the surface water standards triennial review process and are subject to public review. Standards are not changed simply to bring the waterbody into compliance, but are based on sound science that includes evaluation of the risk of impact to humans or aquatic and wildlife communities. Existing uses of the waterbody and natural conditions are considered when standards for specific water segments are established.

These TMDLs meet or exceed the following EPA Region 9 criteria for approval:

Plan to meet State Surface Water Quality Standards: The TMDLs include a study and a plan for the specific pollutants that must be addressed to ensure that applicable water quality standards are attained.

Describe quantified water quality goals, targets, or endpoints: The TMDL must establish numeric endpoints for the water quality standards, including beneficial uses to be protected, as a result of implementing the TMDLs. This often requires an interpretation that clearly describes the linkage(s) between factors impacting water quality standards.

Analyze/account for all sources of pollutants: All significant pollutant sources are described, including the location and the magnitude of sources where data is available.

Identify pollution reduction goals: The TMDL plan includes pollutant reduction targets for all point and nonpoint sources of pollution.

Describe the linkage between water quality endpoints and pollutants of concern: The TMDLs must explain the relationship between the numeric targets and the pollutants of concern and determine whether the recommended pollutant load allocations exceed the loading capacity of the receiving water.

Develop margin of safety that considers uncertainties, seasonal variations, and critical conditions: The TMDLs must describe how any uncertainties regarding the ability of the plan to meet water quality standards have been addressed. The plan must consider these issues in its recommended pollution reduction targets.

Provide implementation recommendations for pollutant reduction actions and a monitoring plan: The TMDLs should provide a specific process and schedule for achieving pollutant reduction targets. A monitoring plan should also be included, especially where management actions will be phased in over time and to assess the validity of the pollutant reduction goals.

Include an appropriate level of public involvement in the TMDL process: This is usually met by publishing public notice of the TMDLs in a newspaper of general circulation in the area affected by the study, circulating the TMDLs for public comment, and holding public meetings in local communities. Public involvement must be documented in the state's TMDL submittal to EPA Region 9.

In addition, these TMDLs comply with the public notification requirements of A.R.S. Title 49, Chapter 2, Article 2.1: Publication of these TMDLs in the A.A.R. is required per Arizona Revised Statute, Title 49, Chapter 2, Article 2.1 prior to submission of the TMDL to EPA. The Department shall:

1. Prepare a draft estimate of the total amount of each pollutant that causes impairment from all sources that may be added to a navigable water while still allowing the navigable water to achieve and maintain applicable surface water quality standards, and provide public notice and an opportunity for comment in a newspaper of general circulation in the affected area;

2. Publish a notice in the A.A.R. (this notice) of the determination of total pollutant loadings that will not result in impairment, a summary of comments received to the initial TMDL public notice, and the Department's responses to the comments;

3. Make reasonable and equitable allocations among TMDL sources, and provide public notice and an opportunity for comment in a newspaper of general circulation in the affected area;

4. Publish a notice in the A.A.R. (this notice) of the allocations among contributing sources, along with responses to any comments received on the draft allocations in a newspaper of general circulation.

Federal law only requires the submittal of the pollutant loadings to EPA for approval. However, the Department considers the pollutant loadings and the draft allocations to be integrally related and that they should be presented together to afford the public a complete understanding of the issues, outcomes and recommendations of the TMDL analysis. For that reason, the Department has combined the loadings and allocations in this publication in the A.A.R.

B. TMDL for the Gila Rive Reaches 15040005-022 and 15040002-004

EXECUTIVE SUMMARY

Reach 15040005-022 (Gila River – Yuma Wash to Bonita Creek) and Reach 15040002-004 (Gila River – Bitter Creek to New Mexico State Line) are listed on Arizona's 303(d) list of impaired waters for suspended sediment concentration exceedances. Reach 15040005-022 was originally listed for turbidity violations in 1990. With Arizona's repeal of its turbidity standard and the adoption of a suspended sediment concentration (SSC) standard in 2002, EPA overfiled on Reach 15040005-022 in 2004, asserting that violations of Arizona's narrative bottom deposits standard had occurred. Subsequently, EPA overfiled on Reach 15040005-022 specifically for suspended sediment concentration in 2009 based on data in Arizona's 2006/2008 305(b) report and additional USGS data that became available after the report was published. Reach 15040002-004 was listed in 2006 for violations of the SSC standard. This TMDL was undertaken in late 2006 for both reaches to establish allocations for attainment of Arizona's water quality standard.

Sampling undertaken in 2007, together with previous ADEQ ambient monitoring data and historic USGS flow history and sediment data, comprised the data set from which allocations were drafted and reductions were calculated. TMDL sampling covered all parts of the annual hydrograph at a number of sampling locations intended to isolate perennial tributary contributions and contributions from reach subwatersheds and the State of New Mexico. Base flow data and storm flow data for both winter storms and summer monsoons were sampled to obtain a comprehensive picture of the critical conditions affecting sediment loads in the watershed.

Arizona's 2003 water quality standard for SSC, the standard under which the TMDLs were drafted, explicitly states that only data "*at or near baseflow*" and excluding data "*during or soon after a precipitation event*" can be used for consideration of impairments. In 2009, Arizona adopted a new SSC standard based on median set values instead of geomean set values and stating that SSC data collected during or within 48 hours of a local storm event could not be used to determine a median value in the minimum set of four samples necessary to evaluate standard attainment. Data was screened by flow history at USGS gauges for selection of sediment data that met the terms of the 2003 standard. Data was subsequently analyzed using flow and load duration curves paired with supplemental model runs of a GIS-based Revised Universal Soil Loss Equation (RUSLE) model. Allocations and load reductions were parsed out into five categories of flow conditions representing the entire range of flows from high flows to historic low flows and summarized in tabular form. Because the geometric mean as used in Arizona's standard is not a conservative value in a mass-balance analysis, data sets for subwatershed analyses of contributions were also calculated as arithmetic means and reductions. The arithmetic means, amenable to allocation and proration, are the numbers on which individual subwatershed reductions are presented. Cumulative geomean reductions are presented for each impaired watershed as a whole.

Results show that extensive reductions are called for in many locations and for many flow categories within the watershed. The Gila River at the New Mexico State Line is already in non-attainment with Arizona water quality standards, with needed mean reductions ranging from 74% to 84% (average 79% reduction). Additional loading

occurs in the Bitter Creek subwatershed below Duncan. Data points to heavy sediment loading in the Yuma Wash to Bitter Creek subwatershed, with needed reductions ranging from 90% to 98% (average 95.4%). The San Francisco River is also a large sediment loading contributor, with reductions needed in three of five flow categories averaging 65.9% for the three. Eagle Creek and Bonita Creek had limited data from which to calculate reductions and draw inferences, but where data existed, both tributaries were within their respective loading limits, though the RUSLE model showed erosion susceptibility of the Eagle Creek watershed. Cumulatively, Reach 15040005-022 meets loading requirements in the two lowest flow categories, and requires reductions for the three highest categories ranging from 45.9% to 95.1% in a geomean analysis. Reach 15040002-004, as a subwatershed nested within Reach 15040005-022's larger watershed, is required to meet a more stringent prorated load from Reach 15040005-022's requirements in four of the five flow categories. These more stringent requirements, not derived from a direct load duration application to Reach 15040002-004, were adopted to ensure that Reach 022 downstream would meet its TMDL. For the fifth (low flow) category, a more stringent number was required by using the direct load duration analysis for Reach 004 itself; this number was adopted as the load allocation for Reach 004. For Reach 15040002-004, implicit margins of safety were used for the four flow categories prorated from Reach 022, whereas an explicit MOS was adopted for the fifth flow category. Reach 004 cumulative reductions required in the geomean analysis range from 0.7% to 89.3% in the two categories where quantification of loads can be preformed with confidence. One category for dry conditions met its TMDL target. Two of the remaining categories had insufficient data to determine attainment.

TMDL CALCULATIONS

The TMDL calculations are based on flow and concentration data analyzed using load duration curves.

The TMDL or loading capacity and the resulting load reductions necessary to meet the TMDL is determined using the TMDL equation:

$$TMDL = \Sigma WLA + \Sigma LA + MOS$$

Where WLA is waste load allocation (point sources), LA is load allocation (nonpoint sources and natural background), and MOS is a margin of safety. Loading capacity, existing loads, and reductions needed are calculated for major perennial tributaries and their associated subwatersheds, at the New Mexico state line, and for remaining subwatershed areas of the Gila River to the base of the lowest impaired reach exclusive of other subwatershed inclusion.

MARGIN OF SAFETY

Explicit margins of safety of 10% of the total maximum daily load value were adopted for each of the five flow categories analyzed for Reach 22. These values were fixed by flow category and expressed in terms of kg/day.

Implicit margins of safety were adopted for Reach 4 in four of the five flow categories in recognition that the allocation of sediment loads as determined by Reach 22 downstream provided for a sizable protective margin without the need for any additional explicit MOS. No explicit allocations for an MOS is thus made for the high flow, moist condition, mid-range and dry conditions flow categories for Reach 4. Implicit margins of safety range from 45.5% to 60.2% for these four categories. For the low flow category, where a direct load calculation for Reach 4 provided more protection than the allocated Reach 22 value (based upon the state water quality standard and the flow history in the reach), an explicit margin of safety allocation of 10% is made and included in the TMDL calculations.

Conservative assumptions in the drafting of TMDL values add additional protection in the form of an uncalculated implicit margin when considered in light of Arizona's 2009 SSC standard. The TMDL adds an additional implicit margin of safety to the calculations in its basis on the 2003 geometric mean standard as opposed to the median standard adopted in January 2009. In all cases considered, the geometric mean value for existing data sets was higher than the median value for each category of flow analyzed in the impaired reaches. Requiring this higher value to conform to the same numeric total maximum daily load target ensures that the 2009 standard recently adopted will be attained with an MOS greater than those explicitly called out in this document.

WASTE LOAD ALLOCATIONS

AZPDES/NPDES Permits

An AZPDES permit for the Alpine wastewater treatment plant (WWTP) near Alpine, Arizona in Apache County sets a monthly limit of 13.04 kg/day and a weekly limit of 18.84 kg/day for total suspended solids. This allocation was not factored into TMDL waste load allocation calculations because of the existence of a dam at Luna Lake immediately downstream, which effectively disrupts hydrologic continuity and prevents TSS loads from being assimilated with loads from the rest of the San Francisco River.

Two additional NPDES permits are reported within the watershed in New Mexico: the Reserve WWTP (Permit ID NM0024163), with monthly TSS mass limits of 19 lbs per day (monthly limit) and 28 lbs per day (seven day limit), and the New Mexico Game and Fish Hatchery at Glenwood, New Mexico (Permit ID NM0030163), with a daily TSS mass average of 166 lbs per day and a daily TSS maximum of 249 lbs per day. As they are beyond the scope of Arizona's jurisdiction, all New Mexico point source contributions will be subsumed into a general load allocation for the state of New Mexico.

There are no other AZPDES permits addressing discharges where TSS or SSC are constituents of concern in Graham or Greenlee counties above the Yuma Wash-Gila River confluence, no municipal separate storm sewer systems, and no Superfund sites within the delineated watershed in Arizona.

MSGP and CGP General Permits

The purpose of Arizona's multi-sector general permit (MSGP) and construction general permit (CGP) is to protect the quality and beneficial uses of Arizona's surface water resources from pollution in stormwater runoff resulting from mining, non-mining, and construction operations and activities. Under the Clean Water Act and Arizona Revised Statutes, it is illegal to have a point source discharge of pollutants that is not authorized by a permit, including stormwater runoff from industrial or construction sites to a water of the United States. To protect water quality, general permits require operators to plan and implement appropriate pollution prevention and control practices for stormwater runoff, including the implementation and maintenance of stormwater control measures that directly result in loading reductions of sediment.

Under Arizona's general stormwater permits, permittees are required to control discharges from the facility as necessary to not cause or contribute to an exceedance of an applicable water quality standard. This requirement forms the basis for the WLA explained below for existing and future permittees covered under the Non-Mining MSGP, Mining MSGP and Construction General Permits.

Permittees may meet the terms of the WLA in one of the following ways:

• The SSC numeric standard (80 mg/l) may be met as a concentration-based wasteload allocation for discharges occurring more than 48 hours after the latest local storm event from each of the individual stormwater outfalls or other points of discharge as identified in the permittee's approved SWPPP or

• Permittees can demonstrate through implementation of erosion best management practices (BMPs) and monitoring that discharges of sediment from the permitted outfalls occurring more than 48 hours after the latest local storm event are not causing or contributing to exceedances of the SSC water quality standard in a downstream receiving water with the A&Ww designated use.

The permitting agency may impose additional monitoring or BMP requirements to determine compliance with the WLA established above. Specific monitoring requirements and BMP requirements will be addressed in SWPPPs to be reviewed by the ADEQ Stormwater and General Permits Unit, as required in Sections 2.2.2 and 3.1.1 of the 2010 ADEQ Mineral Industry and Industrial MSGPs.

LOAD ALLOCATIONS

Nonpoint source contributions from the watershed may come from either natural background conditions or anthropogenic sources. LAs are calculated by subwatersheds and flow duration categories. Natural background quantification is also accounted for as a separate proration where explicitly allocated.

LOAD REDUCTIONS

Load Reductions (LR) are needed when the existing load is larger than the LA calculated using the TMDL equation. The LR can be calculated by:

$$LR = \text{Existing load} - (LA + \text{Natural background} + MOS)$$

The percent reduction needed is calculated by using:

$$\% \text{ Reduction} = (LR/\text{Existing Load}) * 100$$

In cases where the LR is negative, no reduction is necessary. These categories are identified as meeting the category allocation. In instances where the inclusion of the margin MOS causes existing loads to exceed the loading capacity a reduction in the existing load will still be required.

TMDLs identify the amount of pollutant that can be assimilated by the waterbody and still meet water quality standards. The pollutant of concern requiring TMDLs for Gila River Reaches 022 and 004 is suspended sediment concentration. In order to calculate the load in kilograms per day (kg/day) from discharge in cubic feet per second (cfs) and concentrations in milligrams per liter (mg/l), a conversion factor is required:

$$ft^3/sec * mg/l * 28.32L/ft^3 * 86{,}400sec/day * 1\ kg/1000\ g * 1g/1000mg = 2.446\ kg/day$$

The conversion factor of 2.446 was used in the following equation:

$$\text{Existing Load} = Q * [\text{Suspended sediment concentration}] * 2.446\ kg/day$$

TABLES

The following tables detail the TMDL targets and reductions necessary for Reaches 15040005-022 and 15040002-004. Tables 1 and 2 cover Reach 22, while Tables 3 and 4 address Reach 4.

Table 1 addresses TMDL targets, subwatershed allocations, and a summary of percentage reductions necessary for the SSC mean value in Reach 22. Table 2 gives a detailed breakdown of existing mean loads and percentage reductions calculations for each subwatershed analyzed in the Reach 22 analysis. Table 3 addresses TMDL targets, subwatershed allocations, and a summary of percentage reductions necessary for the SSC mean value in Reach 4. Table 4 gives a detailed breakdown of existing SSC loads and percentage reductions calculations for each subwatershed analyzed in the Reach 4 analysis.

Flows and associated loads and targets are broken out into five categories for each analysis, including high flows (0-10% flows), moist conditions (10-40% flows), mid-range flows (40-60%), dry conditions (60-90%) and low flows (>90% flows).

Table 1. Reach 15040005-022 Load Allocations and Summary of Reductions

Reach 15040005-022: Gila River - Yuma Wash to Bonita Creek TMDL calculations, Kg/day			Category 1 ## High Flows	Category 2 Moist Conditions	Category 3 Mid-Range Flows	Category 4 Dry Conditions	Category 5 Low Flows
Cumulative Net Sediment production, Kg/day	Percentage net sediment production	**Cumulative Sediment Target Values**					
5,745,245	100%	Reach 15040005-022					
		Geomeans (Kg/day):	342,300	70,612	34,426	20,734	9,584
		Arithmetic Means (Kg/day):	920,027	167,912	77,425	44,832	19,520
		Load Allocations by Subwatershed					
		(Allocated by Arithmetic Mean Values, Kg/day)					
2,627,985	45.742%	San Francisco River	341,295	62,289	28,722	16,631	7,241
1,820,968	31.695%	Gila River- Headwaters to NM state line	236,200	43,108	19,877	11,510	5,011
689,149	11.995%	Eagle Creek	91,099	16,626	7,666	4,439	1,933
307,413	5.351%	Gila River, Yuma Wash - Bitter Creek	39,875	7,277	3,356	1,943	846
220,610	3.840%	Bonita Creek	29,102	5,311	2,449	1,418	617
79,120	1.377%	Gila River, Bitter Creek - NM state line	10,263	1,873	864	500	218
		Waste Load Allocations	#	#	#	#	#
		Margin of safety: 10%	92,003	16,792	7,742	4,483	1,952
		Cumulative Natural Background, Kg/day:	80,191	14,635	6,748	3,908	1,701
		TMDL, Arithmetic Means, Kg/day:	920,027	167,912	77,425	44,832	19,520

A dual-option WLA is established for existing and future permittees covered under the MSGP and CGP for stormwater outfalls.

Reductions Summary Table	Reductions Needed:	Category 1 High Flows	Category 2 Moist Conditions	Category 3 Mid-Range Flows	Category 4 Dry Conditions	Category 5 Low Flows
Geometric Mean	Cumulative,	**95.1%**	**78.9%**	**45.9%**	**Meets**	**Meets**
Arithmetic Mean	Reach 15040005-022	**91.7%**	**88.3%**	**54.3%**	+	+
Arithmetic Mean	San Francisco River	*	**59.5%**	**62.6%**	-	-
Subwatershed	Gila River- Headwaters to NM state line	*	**74.4%**	**84.3%**	-	-
Breakdown	Eagle Creek	No data	*	**Meets**	-	-
	Bonita Creek	No data	No data	No data	-	-
	Gila River - Bitter Creek - NM state line	* **	**90.7%** **	**78.8%** **	**44.3%** **	+ **
	Gila, Yuma Wash - Bitter Creek	**98.2%**	**97.5%**	**90.4%**	-	-

+ Geometric mean assessments differ from arithmetic mean assessments. Geometric mean determinations substituted.

* Insufficient data: fewer than four data points in the data set.

** Modeled Values - derived from calculations.

-- Reductions not called out except for 303(d) listed reaches where 15040005-022 loads show category meets TMDL requirements.

Table 2. Load Reduction Calculations, Reach 15040005-022

Reach 15040005-022: Yuma Wash to Bonita Creek		*Category 1*	*Category 2*	*Category 3*	*Category 4*	*Category 5*
TMDL calculations, Geomean Kg/day		*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
Cumulative Sediment Target Values						
Reach 15040005-022 Existing		**5,686,864**	**271,857**	**51,771**	**14,650**	**4,853**
Reach 15040005-022 Target TMDL		342,300	70,612	34,426	20,734	9,584
Reach 15040005-022 Target - 10% MOS		308,070	63,551	30,983	18,661	8,626
Reach 15040005-022 Natur 0.0968462		29,835	6,155	3,001	1,807	835
Reach 15040005-022 Load Allocation		**278,235**	**57,396**	**27,983**	**16,853**	**7,790**
Reductions Needed		**95.1%**	**78.9%**	**45.9%**	**Meets**	**Meets**
Reach 15040005-022: Yuma Wash to Bonita Creek		*Category 1*	*Category 2*	*Category 3*	*Category 4*	*Category 5*
TMDL calculations, Arithmetic Means, Kg/day		*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
Cumulative Sediment Target Values						
Reach 15040005-022 Existing		**8,994,546**	**1,162,819**	**137,753**	**66,503**	**156,652**
Reach 15040005-022 Target TMDL		920,027	167,912	77,425	44,832	19,520
Reach 15040005-022 Target - 10% MOS		828,024	151,121	69,682	40,349	17,568
Reach 15040005-022 NB (composite)	0.09685	80,191	14,635	6,748	3,908	1,701
Reach 15040005-022 Load Allocation		**747,833**	**136,485**	**62,934**	**36,441**	**15,867**
Reductions Needed		**91.7%**	**88.3%**	**54.3%**	+	+
TMDL Reduction Calculations, Arithmetic Means Kg/day						
Load Allocations by Subwatershed						
San Francisco River - Existing		**1,390,942**	**153,983**	**76,801**	--	--
San Francisco River - Target		378,754	69,126	31,874	--	--
San Francisco Natural Background	9.89%	37,459	6,837	3,152	--	--
San Francisco Load Allocation (-NB)		**341,295**	**62,289**	**28,722**	--	--
Reductions Needed		*	59.5%	62.6%	--	--
Eagle Creek Existing		No data	**692** ^	**129** ^	--	--
Eagle Creek Target		99,323	18,127	8,358	--	--
Eagle Creek Natural Background	8.28%	8,224	1,501	692	--	--
Eagle Creek Load Allocation (-NB)		**91,099**	**16,626**	**7,666**	--	--
Reductions Needed		No data	*	Meets	--	--
Bonita Creek Exisitng		No data	No data	No data	--	--
Bonita Creek Target		31,795	5,803	2,676	--	--
Bonita Creek Natural Background	8.47%	2,693	492	227	--	--
Bonita Creek Load Allocation (-NB)		**29,102**	**5,311**	**2,449**	--	--
Reductions Needed		No data	No data	No data	--	--
Gila River- Headwaters to NM State Line Existing		**220,131** *	**168,214**	**126,401**	--	--
Gila River- Headwaters to NM State Line Target		262,444	47,898	22,086	--	--
Gila HW-NM Natural background	10.0%	26,244	4,790	2,209	--	--
Gila, HW-NM, Load Allocation (-NB)		**236,200**	**43,108**	**19,877**	--	--
Reductions Needed		*	74.4%	84.3%	--	--
Gila River - Bitter Creek - HW Cumulative Exisitng		4,544,768 **	319,611 **	64,836 **	14,268 **	2,394 **&*
Gila, Bitter-NM State Line, NSD weighted Coefficient		**285,866** **	**20,104** **	**4,078** **	**897** **	**151** **&*
Gila, Bitter Creek - NM State Line Target		11,403	2,081	960	556	21 &
Gila, Bitter Creek - NM State Line Natural Background		1,140	208	96	56	2 &
Gila River - Bitter Creek - NM State Line Load Allocation		**10,263**	**1,873**	**864**	**500**	**218** **&
Reductions Needed		*	90.7%	78.8%	44.3%	* &
Gila,Yuma Wash - Bitter Creek Existing		**2,273,170** #	**293,876** #	**34,814** #	--	--
Gila,Yuma Wash - Bitter Creek Target		44,305	8,086	3,729	--	--
Gila,Yuma Wash - Bitter Creek Natural Background (.09685)		4,431	809	373	--	--
Gila,Yuma Wash - Bitter Creek Load Allocation		**39,875**	**7,277**	**3,356**	--	--
Reductions Needed		98.2%	97.5%	90.4%	--	--

* Insufficient data: less than four data points in the data set.

** Modeled Values - derived from calculations.

++ Value calculated as subwatershed net sediment delivery multiplied by modeled existing load

\+ Geometric mean assessments differ from mean assessments. Geometric mean determinations substituted.

\# Figures modeled as composite loads comprised of the product of average flow and average concentration. NSD percentage allocation of Solomon total load applied.

& Category targets and reductions calculated from more conservative Arizona water quality standard numbers.

^ Existing load presented as instantaneous load average using measured discharge due to water diversions upstream of sampling location. Daily mean flow/load calculations do not account for water diversions.

Table 3. Reach 15040002-004 Load Allocations and Summary of Reductions

Reach 15040002-004. Bitter Creek to New Mexico

Arizona WQ standards-based target values shown for comparative purposes.

Underlined target loads represent the category selection for TMDL calculation.

Net Sediment production, Kg/day	Percentage net sediment production	TMDL calculations, Kg/day		Category 1 High Flows	Category 2 Moist Conditions	Category 3 Mid-Range Flows	Category 4 Dry Conditions	Category 5 Low Flows
		Cumulative Sediment Target values						
		Reach 15040002-004, Gila Bitter Creek to NM						
1,943,209	100.000%	Geomean Standard-mandated		181,722	38,533	17,800	8,998	**293**
		Prorated Reach 022 Values		**113,199**	**23,351**	**11,385**	**6,857**	3,170
		Arithmetic Mean						
		Standard mandated		687,544	122,947	52,172	24,468	**548**
		Prorated Reach 022 Values		**273,847**	**49,979**	**23,046**	**13,344**	5,810
		Load Allocations (Arithmetic Means, Kg/day)						
1,820,968	93.709%	Gila, Headwaters to NM state line		236,200	43,108	19,877	11,510	416
122,241	6.291%	Reach 15040002-004, Gila Bitter Crk to NM		10,263	1,873	864	500	28
		Waste Load Allocations		0	0	0	0	0
		MOS allocation, kg/day		0	0	0	0	55
		Natural Background Allocation	10%	27,385	4,998	2,305	1,334	49
		Margins of Safety:		#	#	#	#	10.0%
		TMDL:		273,847	49,979	23,046	13,344	548

Margin of safety: None explicitly included for Categories 1-4. Margin implicit in the use of more stringent prorated Solomon target values relative to standard-mandated values.

Reductions Summary Table		*Category 1*	*Category 2*	*Category 3*	*Category 4*	*Category 5*
Cumulative Load Reductions		*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
Geomean	Cumulative,	* **	**89.3%** **	**0.7%** **	**Meets** **	* **&
Arithmetic Mean	Reach 15040002-004	* **	**85.9%** **	**68.0%** **	+ **	* +&**
Arithmetic Mean Subwatershed Breakdown	Gila River- Headwaters to NM state line	* +	**74.4%**	**84.3%**	--	**90.9%** &
	Gila River - Bitter Creek - NM state line	* **	**90.7%** **	**78.8%** **	--	* **&

\+ Geometric mean assessments differ from mean assessments. Geometric mean determinations substituted.

& Category targets and reductions calculated from more conservative AZ water quality standards (not prorated from Solomon loads).

** Modeled Values - derived from calculations.

* Insufficient data; fewer than four data points in data set

Table 4. Load Reduction Calculations, Reach 15040002-004

Reach 15040002-004: Gila River - Bitter Creek to NM state line	*Category 1 High Flows*	*Category 2 Moist Conditions*	*Category 3 Mid-Range Flows*	*Category 4 Dry Conditions*	*Category 5 Low Flows*
TMDL Reduction Calculations, Geomeans Kg/day					
Reach 15040002-004 Existing (prorated from RUSLE net sediment	**2,047,285** ** *	**197,327** **	**10,316** **	**4,429** **	**1,082** &*
Reach 15040002-004 TMDL Load Capacity	113,199	23,351	11,385	6,857	293
Reach 15040002-004 TMDL - MOS	113,199 $	23,351 $	11,385 $	6,857 $	264
Reach 15040002-004 Natural Background	11,320	2,335	1,138	686	26
Reach 15040002-004 Load Allocation	**101,879** **	**21,016** **	**10,246** **	**6,171** **	**238**
Cumulative Reductions Needed	*	**89.3%**	**0.7%**	**Meets**	*
TMDL Reduction Calculations, Arithmetic Means Kg/day					
Reach 15040002-004 Existing (prorated from RUSLE net sediment	**4,544,768** **	**319,611** **	**64,836** **	**14,268** **	**2,395** &*
Reach 15040002-004 Target TMDL	273,847	49,979	23,046	13,344	548
Reach 15040002-004 Target - 10% MOS	273,847 $	49,979 $	23,046 $	13,344 $	493
Reach 15040002-004 Load Allocation	273,847	49,979	23,046	13,344	493
Reach 15040002-004 Load Allocation (-NB)	**246,462** **	**44,981** **	**20,741** **	**12,010** **	**444**
Cumulative Reductions Needed	*	**85.9%**	**68.0%**	+	*
TMDL Reduction Calculations, Arithmetic Means Kg/day					
Load Allocations by Subwatershed					
Gila River- Headwaters to NM State Line Existing	**220,131** *	**168,214**	**126,401**	--	**4,578**
Gila River- Headwaters to NM State Line Target	262,444	47,898	22,086	--	462 &
Gila HW-NM Natural background 0.1	26,244	4,790	2,209	--	46
Gila, HW-NM, Load Allocation (-NB)	**236,200**	**43,108**	**19,877**	--	**416** &
Reductions Needed	* +	74.4%	84.3%	--	90.9% &
Gila, Bitter-NM State Line, NSD weighted Coefficient	**285,866** ** *	**20,104** **	**4,078** **	--	**151** ** *
Gila River - Bitter Creek - NM State Line Target	11,403	2,081	960	--	31 &
Gila River - Bitter Creek - NM State Line Natural Background (0.1)	1140	208	96	--	3
Gila River - Bitter Creek - NM State Line Load Allocation	**10,263** **	**1,873** **	**864** **	--	**28** **&
Reductions Needed	*	90.7%	78.8%	--	* &

* * Insufficient data; fewer than four data points in category

** Modeled Values - derived from calculations. No data

++ Value calculated as subwatershed net sediment delivery*modeled existing load

\+ Geometric mean assessments differ from mean assessments. Geometric mean determinations substituted.

\# Figures modeled as composite loads comprised of the product of average flow and average concentration.
NSD percentage allocation of Solomon total load applied.

$ Margin of safety implicit in the use of prorated Solomon arithmetic mean loads.

& Category targets and reductions calculated from more conservative Arizona water quality standard numbers (not prorated from Solomon loads)

SUMMARY OF COMMENTS

Comments were received from Region 9 of the USEPA and Freeport-McMoRan, Incorporated. Below is a summary of the comments and ADEQ's responses.

Freeport-McMoran, Incorporated

Freeport-McMoran (FMI) submitted extensive comments running multiple pages, which will not be cited in their entirety in this summary. Instead, specific points raised or specific perspectives offered by FMI requiring response are paraphrased, with ADEQ's response cited in full.

Comment 1. **Proposed Wasteload Allocation for the Morenci Mine**

A. Allocations are not "reasonable or equitable allocations among sources."

It is not entirely clear from FMI's submitted comment whether the reference to allocations is intended to address load allocations project-wide, or wasteload allocations specific to potential dischargers. Both will be addressed.

1. Load Allocations, Project Scale

Please refer to Section 5.2 of the draft TMDL, where discussion concerning allocation development is presented:*"…the approach taken to meet Arizona's 2003 suspended sediment concentration standard focused upon isolating representative cumulative watershed sediment load contributions at or near the mouth of the major contributing perennial tributaries, at critical points within the impaired reaches where USGS gauge data was available, and near the New Mexico state line… Loadings were allocated amongst the various tributaries and subwatersheds of the Gila River based upon results of runs of the RUSLE model (Figure 3)."* Section 6.2 adds additional context: "*In this study, RUSLE was used to determine the respective net sediment production for each of the subwatersheds comprising a component of the entire watershed to the confluence of Yuma Wash. By choosing to focus on net sediment delivery rates by subwatershed instead of the percentage of total watershed area, focus is placed upon the subwatersheds particularly subject to erosion problems, where more stringent load reductions are called for. Net sediment productions were summed and subwatersheds were then assigned a percentage allocation based upon their percentage of net sediment delivery."* ADEQ believes, therefore, that the load allocations are in fact objective, scientifically justifiable, reasonable, and equitable among sources.

As presented in the draft TMDL and elsewhere in these responses to comments (see Comment 6), it is environmentally feasible to achieve the allocations. Economic feasibility is also considered reasonable; the vast majority of land (approximately 75%) within the Gila River watershed is federal or reservation land, and the costs of addressing nonpoint source pollution on these lands fall to other parties, including the U.S. Forest Service in the Gila and Apache-Sitgreaves National Forests and the Bureau of Land Management. New Mexico acreage makes up more than 2/3rds of watershed area; where federal lands do not exist in the Gila watershed in New Mexico, the state of New Mexico is responsible for addressing costs. State lands in both New Mexico and Arizona comprise a fair percentage of the remaining area. In short, any costs incurred in meeting the allocations of this TMDL are distributed widely, and federal Section 319 grant monies are available to private parties and landowners to assist in defraying costs for voluntarily-implemented measures and projects to improve nonpoint source pollution on a local scale. Technological feasibility is also well within means, as an extensive set of tested, low-cost, and no to minimal engineering control best management practices (BMPs) are available for implementation, many of which have been developed and used successfully by federal land management agencies for years. This knowledge is widely and publicly available. These points have been addressed in Sections 8.0 to 8.3 of the draft TMDL document.

A summary of voluntary measures and projects within watershed boundaries administered through the Section 319 program for the states of Arizona and New Mexico with modeled load reductions was added to the draft TMDL document.

2. Wasteload Allocation, Specific to FMI

As stated by EPA, wasteload allocations (WLAs) shall be "reasonable" and "avoid uncertainties." These requirements are met in that FMI is being held to a WLA no more stringent than the current water quality standard, which the 2010 MSGP implicitly requires.

As to FMI's stated points enumerated in this section:

a. *"The Morenci Mine is located distant from the downstream allegedly impaired water in a separate subwatershed"*

The Morenci Mine operation occupies an area draining to an interconnected and proximate hydrologic network relative to the impaired reach at issue (less than twenty linear miles from USGS gauge 09448500 to Chase Creek-San Francisco River confluence as a point of reference). Gradients on FMI property extending into the San Francisco and Eagle Creek subwatersheds are comparatively high, thus increasing the probability that persisting run-off will join one of the perennial tributaries to the Gila. Stormwater discharges from FMI property clearly have the potential to add to the cumulative sediment load received by the impaired reach via transport by the 5th order Eagle Creek, 6th order San Francisco River and the 7th order Gila River.

b."*Results from recent surface water samples from the San Francisco River and Eagle Creek…demonstrate that [both] meet the applicable SSC standard (i.e. 80 mg/l)."*

ADEQ notes regarding FMI's reference to recent samples from Eagle Creek and the San Francisco River that this data comprises a small subset of a longer period of record for data from both streams. When the longer period of record is considered, SSC exceedances in baseflow and stable elevated flow conditions have been periodically observed, thus indicating unacceptable contributions to cumulative sediment loads in the impaired reach. Furthermore, RUSLE modeling undertaken in this TMDL analysis strongly demonstrates that both watersheds have high erosion rates that place them at the top of the subwatersheds analyzed in the project for modeled gross and net sediment load contributions. Refer to Table 3 in the TMDL document, where the weighted average gross soil erosion (kg/sq mi/yr), weighted average net sediment delivery (kg/sq mi/yr), and weighted average susceptibility to mass wasting, (normalized scale 1.0-3.0) for both Eagle Creek and the San Francisco River demonstrate high susceptibility to erosion and consequent sediment loading. It is important to note that RUSLE model results show the "as is" condition of the watersheds being modeled with the conservation factor incorporated and land cover reflecting existing land use patterns. The results are thus indicative of currently existing nonpoint source contributions and stressors and are not considered results free of anthropogenic impacts.

c."*The proposed wasteload allocation is not economically or technologically achievable even in the event of a discharge occurring more than 48 hours after the latest local storm event."* This comment pertains to the "environmental, economic, and technological feasibility" factor of ARS 49-234(F). All three factors mentioned in the statute are considered feasible for the implementation of this TMDL. Regarding environmental feasibility, FMI is already required by the terms of the multi-sector general permit (MSGP) to monitor and implement best management practices to safeguard water quality in flows resulting from storm events. Arizona water quality standards serve as the basis of both the WLA and the MSGP. With the TMDL WLA, FMI is being asked only to adhere to Arizona's SSC water quality standard in its stormwater discharges.

FMI is already required to monitor discharges under the MSGP; minimal additional expenses are expected to achieve compliance with the WLA. If water quality exceedances become apparent for stormwater discharges exceeding 48 hours duration, improvement of best management practices is expected as already required under the MSGP.

d*."The potential cost does not support the benefit…"* This comment pertains to the "cost and benefit" factor in the wording of ARS 49-234(F). As mentioned above in (c.), little is expected in the way of additional expense to monitor and improve BMPs, if necessary, that FMI is already obligated to perform as a part of its MSGP. These additional expenses would be incurred only in the event of a) discharges exceeding 48 hours in duration and b) BMPs already in place are inadequate to achieve their intended objectives, in which case FMI is obligated by the MSGP to correct or improve.

ADEQ will add discussion regarding this issue in the TMDL. ADEQ expects minimal additional costs resulting from the application of a WLA for two reasons: storms producing runoff for more than 48 hours from sub basins of small areal extent are relatively rare occurrences, and BMPs already called for by the MSGP should be sufficient to mitigate any potential problems.

e. *"The discharges would occur only in response to storm events and are already subject to control requirements under Arizona's multi-sector general permit that address sediment loading and result in pollutant reductions of sediment."* The draft TMDL already makes a specific exclusion for discharges that do not exceed 48 hours after local storm events; flows persisting for longer than that time window are required to meet the criterion established by the Arizona water quality standard, regardless of the mode of origination. Discharges addressed under the WLA are thus being held to the same standard applicable to ambient water quality state-wide. The MSGP, while addressing sediment loading, does not provide for a quantitative benchmark that is necessary for TMDL WLA verification and effectiveness evaluation.

ADEQ is required by the federal TMDL process to determine and grant WLAs for permitted facilities within the watershed that have the potential to discharge to the hydrologic network where an impairment occurs. FMI's Stormwater Pollution Prevention Plan (SWPPP) clearly states that sediment is a pollutant of concern; therefore assignment of a WLA is reasonable. It is important to state that the WLA serves primarily as a type of authorization allowing for the presence of constituents of concern in quantities that are consistent with the loading analysis and secondarily as a regulatory or restrictive agent. As a permittee in the basin with reasonable potential to negatively impact water quality in the impaired reach, FMI must have a WLA in conjunction with the TMDL; lack of assignment of a WLA would not allow the Morenci mine to discharge any sediment from its property.

ADEQ has met its statutory mandate to make reasonable and equitable allocations. Where FMI has pointed out that supporting elements itemized under ARS 49-234(F) have not been addressed in the draft document, ADEQ has added the necessary language to the TMDL in keeping with the foregoing discussion. The WLA is no more stringent than the state water quality standard already requires; FMI is not a "remote …discharger" in relation to the impaired reach; and there is a reasonable potential for the permitted discharges to affect downstream water quality.

B. *Definition of Wasteload Allocation and Geographic Relation to Impaired Water Body*

40 CFR 130.2(h) defines a wasteload allocation (WLA) as follows:

"*The portion of a receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution. …"*
ADEQ does not interpret the definition of 40 CFR Section 130.2(h) for a WLA as one that is limited to discharging directly into an impaired water. There is nothing in the definition requiring that a point source discharge directly to an impaired segment in order to be assigned a wasteload allocation. Point sources, whether existing or future, can be

anywhere within an interconnected hydrologic network and need only be assessed as having reasonable potential to add to the cumulative loading of the receiving water under consideration. In large watersheds with multiple dischargers to the network, but not the impaired reach, if each of the dischargers claimed immunity from the application of any WLA, it is possible the cumulative effect of those discharges alone could be responsible for exceeding the loading capacity of the impaired water. Numerous examples of TMDLs throughout the nation could be provided of point source WLAs being applied to dischargers not directly on impaired waters.

C. *Requested approach similar to 2004 Boulder Creek TMDL*

Stormwater regulation has evolved since the 2004 Boulder Creek TMDL was written. If written today the Boulder Creek TMDL would contain language consistent with the draft Gila River TMDL. EPA released a draft 2010 memorandum revising portions of a November 2002 memorandum concerning stormwater discharges and their place in a TMDL context. In the 2010 memorandum, EPA states:

"Section III of the 2002 memorandum affirmed the appropriateness of an iterative adaptive management best management practice (BMP) approach for improving stormwater management over time as permitting agencies, the regulated community, and other involved stakeholders gain more experience and knowledge…"

EPA further states in the 2010 memo:

"As stated in the 2002 memorandum, EPA expects TMDL authorities will make separate aggregate allocations to NPDES-regulated stormwater discharges (in the form of WLAs) and unregulated storm water (in the form of LAs). EPA also recognized that the available data and information usually are not detailed enough to determine waste load allocations for NPDES-regulated storm water discharges on an outfall-specific basis."

The presence of numerous historic digs and waste piles located in Freeport's identified stormwater basins are cause for concern; therefore, the application of a wasteload allocation with quantitative and measureable benchmarks is warranted.

Comment 2. **Proposed Wasteload Allocation for Construction General Permits**

FMI states "For many of the same reasons set forth above, FMMI is opposed to the imposition of any wasteload allocation on construction general permit activities, especially where such activities may be remote from the actual impaired segment." As ADEQ has already addressed these reasons in the previous comment, they will not be revisited here.

It is noted that without specific provision in the TMDL in the form of a WLA, no new CGPs could be authorized or issued in the watershed of the impaired reach where the potential exists for discharge to enter the hydrologic network and add to cumulative sediment loading. As future sites and applicants for CGPs cannot be forecast ahead of time, the provision for CGP WLA coverage must be written and applied broadly within the affected watershed.

Comment 3. **Listing Decision for Reach 15040005-022 is flawed**.

In response to FMI's comments to EPA regarding the listing of Reach 15040005-022 for SSC during EPA's public comment period closing September 21, 2009, EPA extensively addressed FMI's comments regarding the decision in "Enclosure 1: Responsiveness Summary EPA Decision Concerning Arizona's 2006-2008 CWA Section 303(d) List" dated November of 2009. In the document, EPA notes that though it is not bound to follow Arizona's methodology in determining whether to over-file on a reach, it has done so in this instance and determined that an impairment exists. ADEQ concurs with EPA's determination that the reach is impaired for suspended sediment concentration; ADEQ's assessment of data received after Arizona's 2006-2008 Section 305(b) Water Quality Assessment report was published confirms that the reach is impaired.

Though tangentially related, SSC listings are not dependent upon violations of the narrative bottom deposit standard or upon violations of the narrative biocriteria standard. Conversely, the attainment of one of a set of related water quality criteria does not mean that the others are attaining by simple association. ADEQ notes that listings for analytes of concern are mutually exclusive and stand upon their own merits, and that adherence to this principle has been consistent in the state water quality assessment. ADEQ also notes that in the 2004 and 2006-2008 water quality assessments, nine reaches state-wide were listed for SSC impairments, including the two that are the subject of these TMDLs. In none of the other listings were the related narrative standards considered as a basis or as corroborating information for the SSC listing determination.

Except for a brief period between 2002 and 2004, Reach 15040005-022 has been listed for turbidity, sediment, or SSC since 1990 and has been on the ADEQ priority list in one form or another since the late 1990s. This TMDL study was commenced in late 2006. Public presentations were held in 2007 and the spring of 2009.

Comment 4. **Numeric SSC standard is flawed as applied to Reach 022 [*due to*] lack of correlation between violations of SSC standard and impairment of aquatic life**.

The numeric SSC standard was adopted after a statewide triennial review and public review and comment in 2002 and is an accepted water quality standard in the Arizona Administrative Code. The EPA approved ADEQ's adoption of its numeric SSC standard in 2002. Water quality standards are applied universally for a given designated use and are not considered valid for some reaches and flawed for others.

Comments 3 and 7 responses add additional context regarding this comment.

Comment 5. **Concerns Regarding Natural Background Sources of Sediment**

A. Natural source contributions are likely the largest and most significant contributors.

Site-specific standards are developed only in cases where it is clearly provable that natural background conditions alone, absent any human impacts, cause water quality standards to be unattainable. In other words, natural background conditions preventing attainment of water quality standards must be clearly demonstrated and documented before a site-specific standard approach is justified. ADEQ's data collection and assessment of natural background conditions does not support any conclusion that natural background conditions prevent attainment of the SSC water quality standard.

B. Natural Background Sources of Sediment. From the perspective of protecting the state's water quality, the primary objective of conducting a natural background analysis is to minimize anthropogenic impact and secondarily to allow for as much hydrologic process to operate as can reasonably be accepted consistent with the first objective. The purpose is not, and cannot be, to attempt to maximize the hydrologic process permitted while sacrificing the objective of minimizing anthropogenic impacts. Selecting natural background sites lower in the Eagle Creek and San Francisco watersheds would inappropriately bring the analysis of natural background conditions into a region where there are clearly adverse and cumulatively increasing human impacts (grazing, recreational use, logging, road crossings) and would not permit any sort of assessment as to whether SSC values were attributable to anthropogenic activities or truly natural conditions. Additional analysis on soil erosivity characteristics for subwatersheds above natural background sites as compared to average soil erosivity in the major perennial tributary watersheds confirms ADEQ's premise that the natural background subwatershed soil characteristics are representative of the larger watersheds.

FMI cites the use of Eagle Creek and San Francisco River headwaters sites as being inappropriately chosen indicators of natural background conditions by claiming they are "likely out of the higher natural erosive soil conditions that naturally exist in the lower portions of the watershed," yet omits recognition of Bonita Creek's use in determination of natural background conditions. Bonita Creek shares many characteristics with the Gila River in the vicinity. Sites selected for natural background use on Bonita were at or relatively near the mouth of the creek. Gradient, ecosystem, riparian community, soil types, and geologic units in the area are similar to the nearby Gila River. Bonita Creek is recognized as an Outstanding Arizona Water, with grazing being excluded from the lower reaches, and human access limited along the river channel for a number of years. It is a prime example of the conditions ADEQ seeks in trying to determine natural background conditions. The averages of natural background suspended sediment concentrations relative to the standard value of 80 mg/l attributable to Bonita Creek (8.47%) did not differ appreciably from the averages for Eagle Creek (8.28%) and San Francisco River sites (9.89%). This similarity suggests that the sites were appropriately chosen.

FMI indicates that selection of the sampling sites ignores the contribution of sediment from large ephemeral drainages. Ephemeral watershed total sediment loading of the Gila River system is likely occurring in storm events, and these processes are probably exacerbating the Gila's suspended sediment problem. However, ephemeral watersheds suspected of contributing the most to exacerbating the problem are themselves prime examples of improper land management and the adverse effects of human activities the TMDL is designed to address. Therefore they are not suitable for natural background consideration. Examples of human activities suspected of exacerbating sedimentation in ephemeral drainages include agricultural overland flow diversions creating channelization and the inception of head cutting near the Gila, compounded by Arizona Highway 75 construction and unregulated grazing above this highway near Duncan. Many of these activities have been ongoing or in place for a number of generations. They can in no way be considered as representative of natural background conditions**.**

C. Regarding meeting the requirements of TMDL Statute § 49-234 (D). The TMDL statute provides that "ADEQ shall propose a draft estimate of the total amount of each pollutant that causes impairment from all sources and that may be added to the navigable water while still allowing the navigable water to achieve and maintain applicable surface water quality standards" and "shall determine draft allocations among the contributing sources that are sufficient to achieve the total loadings." These requirements are met and the estimates are presented in Tables 8, 9, 10, and 11 of the draft TMDL. Not only were loading and total load reductions calculated considering the contributions from major subwatersheds (sources), they were further analyzed and classed according to the flow classes implicated for SSC exceedances. RUSLE modeling was used in support of this approach (TMDL Table 3).

FMI has quoted several excerpts of narrative language from the draft TMDL as supporting evidence that natural background conditions have not been accurately characterized. Below is ADEQ's explanation of these statements in the context of the document.

1. "Many desert streams exhibit sand-dominated substrates and habitat as a natural condition…"

This citation was drawn from a discussion of erosion and sedimentation as a contributing factor to nonpoint source loading. FMI's citing of the following statement that "Friable soils and sparse vegetative cover in open desert area *contribute to* relatively high natural levels of sediment loading" [emphasis added] does not assist them in supporting their contention. ADEQ did not state that these factors *caused* relatively high levels of natural sediment loading. The language is intended to honestly acknowledge once again that there is susceptibility in the soils and land cover to erosive processes relative to other landscapes where soils have more organic content and protection, such as grasslands, forests, or pasture/meadows. Historic land use practices within the watershed have exacerbated the susceptibility of naturally friable soils to erode.

2. "Given the low sediment delivery rates and the long distances the streams in the project study are traveling, it is concluded that a significant portion of the sediment contributing to exceedances of the state water quality standard is attributable to this hydrologic process…"

FMI's citation was drawn from a subsection in the "Summary of Nonpoint Sources" section discussing channel storage as a hydrologic function likely to contribute to slow recovery of the Gila River system. While channel storage is a natural process present to some degree in all streams, whether impaired or unimpaired, the degree to which channel storage degrades water quality or retards the improvement in water quality conditions is dependent upon the quantities of sediment stored, the size of the hydrologic network, and most importantly, the nonpoint source contributions over time that are making deposits into in-channel storage.

The language cited has been edited to state more clearly that in-channel sediment reservoirs consist of contributions from both natural source loading and nonpoint source loading, and that the relative percentages of each in the total sediment load stored in-channel reflect the degree of impairment of the hydrologic system for sediment loading when state water quality standards are exceeded. As natural background loading has been quantified at a level well below the standard and in and of itself does not cause exceedances, the SSC exceedances in the impaired reaches are attributed to the nonpoint source loading component of in-channel storage when in-channel storage is considered. The natural background research and determination have supplied the information necessary to discriminate between the relative percentages of natural loading and nonpoint source loading for in-channel storage.

3. "Semi-arid regions with sparse ground cover…." The statement following this in the TMDL is: "Grazing activities, where not properly managed, can particularly add to erosion and sedimentation processes along watercourses. This can occur due to multiple factors [associated with grazing]…." The citation was lifted out of a section specifically addressing grazing as an identified nonpoint source activity contributing to WQ degradation.

4. "Due to the influence of a number of factors, …natural conditions including the inherent friability of soils, …"

This statement was cited from an enumeration of factors that will prevent rapid improvement in the Gila's sediment supply problem. FMI omits citing additional enumerated factors in the same list that do not support their interpretation, including one that immediately follows the quotation cited:

"Amount of sediment currently stored in the hydrologic system as in-channel storage as *the result of over 100 years of land use activities synergistically operating with natural processes*."[emphasis added]

"Numerous small-scale sediment [nonpoint] loading contributions not easily isolated."

"Widespread dispersal of diffuse nonpoint sources."

D. *"Reach 15040005-022 should be delisted for alleged sediment impairment until ADEQ is able to demonstrate that the removal of all anthropogenic point and non-point sources…would result in attainment of the water quality standard."*

FMI is asserting that delisting should occur for Reach 022 until ADEQ satisfies the hypothesis that the standard would not be attained even with the removal of all point and nonpoint anthropogenic sources. Data collected and analyzed in the preparation of the TMDL indicate that the standard can be achieved and that the exceedances are not due solely to natural background.

Comment 6. **The draft TMDL is not expected to attain standards.**

Standard attainment is consistently possible in the higher-order reaches of the Gila River if nonpoint source problem areas are addressed. While improvement in conditions is expected to be incremental and slow due to a number of factors, and relies in part on our sister state New Mexico doing its part, the TMDL has been written to attain water quality standards, with percentage reductions calculated based upon appropriate water-quality targets. However, there is a great backlog of channel sediment storage from decades of past nonpoint source contributions that can only be cleared out gradually. Improvements will be seen over time once sediment resupply due to nonpoint source contributions has ceased or been brought under control and flushing of sediments has occurred.

Comment 7. **Interpretation/Implementation of Narrative Bottom Deposit Standard**

A. *Proper indicators of impairment for SSC*.

Directly-measured SSC values, not benthic macroinvertebrate scores, are the proper indicators to determine SSC related impairments. IBI scores, while supporting evidence of aquatic ecosystem health in some contexts, do not override quantitative analyses of SSC samples in determining whether SSC impairments exist. As previously mentioned (see response to Comment 3), Reach 022 is listed as impaired for SSC. Other related narrative standards play no role in the determination of impairment for SSC; their utility in assessment and listing protocols is restricted solely to their respective scopes of inquiry, whether accumulated bottom deposits, or the health of macroinvertebrate communities. The TMDL was written to address SSC exceedances and the load reductions necessary to attain the applicable SSC water quality standard. When considering the SSC standard, directly-measured SSC results are the only legitimate indicators for assessing impairment for suspended sediment. All other metrics are ancillary in their application and interpretations, including IBI scores.

B. Erroneous conclusion regarding Reach 022 impairment for fish and macroinvertebrates.

Each measure related to a water quality standard, whether narrative or numeric, stands in its own right. Supporting information in the form of additional supplied metrics was included in this draft to present a more comprehensive picture of the health of the reach.

EPA comments

1.) Time Frame and Future Monitoring:
For the suspended sediment concentration TMDLs the newly approved 2009 suspended sediment concentration standard will be used to assess attainment of the numeric targets in the TMDLs. Describe what the recommended monitoring requirements will be, including the frequency and location of sampling.

Additional discussion has been added regarding follow-up monitoring strategies in significantly more detail for the …SSC TMDLs, with recommended sites, their locations, land ownership status and recommended sampling frequencies presented. ADEQ has suggested stakeholders use the concentration-based water quality standard as the benchmark for evaluation of remediation efforts on a subwatershed scale instead of attempting to incorporate a more sophisticated load analysis.

2.) Section 8 - Implementation Plan: EPA suggests that a detailed and effective plan be provided in the near future, and a timeline for completing an implementation plan be included in the TMDLs. Please change the title of this section to TMDL Implementation. Also, please clarify the execution of the implementation plan by stakeholders is voluntary, not the writing of the implementation plan itself.

The title of Section 8 has been changed as suggested for … the Gila River SSC … TMDLs, and clarification has been added to Section 8 that the execution of the implementation plan is voluntary. ADEQ notes that Section 8 does constitute the implementation plan for both Gila documents, and additional detail has been added to all TMDLs regarding implementation and monitoring activities. Language has been added to Section 8.0 to indicate more specifically what ADEQ's approach will be in the watershed. This approach is comprised of laying out needed reductions by subwatershed and waiting for local stakeholder groups to come forward with detailed proposals for efforts specific to their subwatersheds, which ADEQ can then assist and offer more detailed direction on.

3.) Inclusion of dates in the Implementation Plan Section: The dates included in the Healthy Lands initiative and the description of the Arizona Watershed Improvement Plan (WIP) appears to be outdated. We suggest adding current dates to these sections. We also suggest the addition of dates to the public participation section to clarify when meetings took place.

Further research and inquiry has been done as to the status of Arizona's progress and/or participation in these efforts since receiving EPA's comments. The narrative has been updated to reflect this new information as of January 2011. Dates have been added to the documents as suggested.

4. Name and address of agency personnel with whom persons may communicate:

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Copies of the final TMDL may be obtained from the Department by contacting the numbers above. The final TMDL may also be downloaded from the Department's web site at: http://www.azdeq.gov/ environ/water/assessment/status.html.